

526,668

Rec'd PTO 29.IIL 2005

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
25 March 2004 (25.03.2004)

PCT

(10) International Publication Number
WO 2004/023964 A1

(51) International Patent Classification⁷: A47L 9/00, 5/36

(74) Agents: SMITH, Gillian, R. et al.; Intellectual Property Department, Dyson Limited, Tetbury Hill, Malmesbury, Wiltshire SN16 0RP (GB).

(21) International Application Number:

PCT/GB2003/003667

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(22) International Filing Date: 21 August 2003 (21.08.2003)

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(25) Filing Language: English

Published:

(26) Publication Language: English

— with international search report

(30) Priority Data:
0221345.2 14 September 2002 (14.09.2002) GB

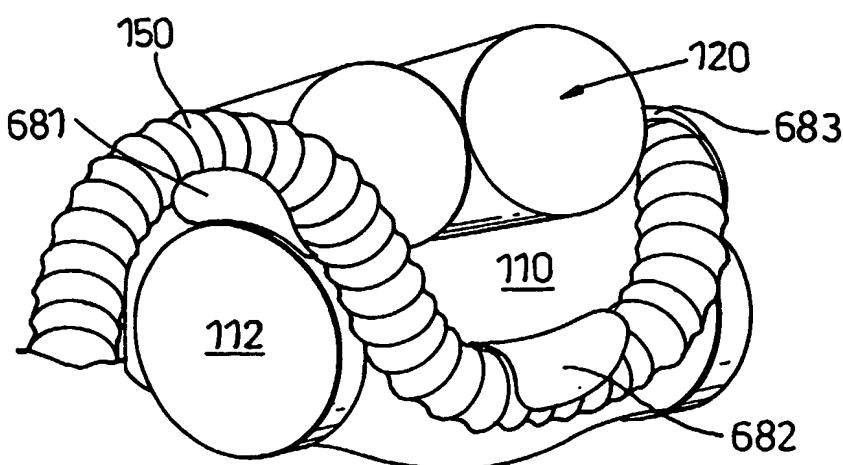
[Continued on next page]

(71) Applicant (*for all designated States except US*): DYSON LTD [GB/GB]; Tetbury Hill, Malmesbury, Wiltshire SN16 0RP (GB).

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): HEATLEY, Emma, Jane [GB/GB]; 6 The Street, Westonbirt, Sherston, Gloucestershire GL8 8QT (GB).

(54) Title: A CLEANING APPLIANCE



Best Available Copy

WO 2004/023964 A1

(57) Abstract: A cleaning appliance of the cylinder type comprises a main body (100) and a hose (150) for carrying fluid flow between a wand (160) and the main body (100). Guide means (channel 300) are located on the main body (100) for guiding the hose (150) along a sinuous hose storage path around the periphery of the main body (100). Locating means (collar 350) aid a user in correctly fitting the hose (150) to the channel (300). Retaining means (311, 312) retain the hose at at least two intermediate points between the ends of the hose. This allows the hose (150) to have a sufficiently large bending radius at each end (151, 168).



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A Cleaning Appliance

This invention relates to a cleaning appliance, such as a vacuum cleaner.

5

Cleaning appliances such as vacuum cleaners are well known. The majority of vacuum cleaners are either of the 'upright' type or of the 'cylinder' type (called canister or barrel machines in some countries.) An example of a cylinder vacuum cleaner manufactured by Dyson Limited under the name DC05 ("DC05" is a trade mark of Dyson Limited) is shown in Figure 1.

10

Cylinder vacuum cleaners generally comprise a main body 10 which contains separating apparatus 11 such as a cyclonic separator or a bag for separating dirt and dust from an incoming dirty airflow. The dirty airflow is introduced to the main body 10 via a suction 15 hose 15 and a wand 16 assembly which is connected to the main body 10. The main body 10 of the cleaner is dragged along by the hose as a user moves around a room. A cleaning tool is attached to the remote end of the hose and wand assembly.

15

Cylinder vacuum cleaners are often perceived to have a disadvantage of being difficult to store. Although the main body of the cleaner is usually fairly compact, the suction hose and wand can take up a considerable amount of space. One of the reasons for this is that the suction hose has a robust construction which is sufficiently tough to allow the hose to pull the main body along, and to withstand abrasion during use. This robustness can make it difficult to store the suction hose.

20

There have been various proposals for storing the suction hose of a cylinder type of vacuum cleaner. US 883,413 shows a vacuum cleaner with a cylindrical casing. The long suction hose is stored by coiling it a number of times around the periphery of the casing. An annular trough is provided near the base of the casing to support the

lowermost coil of hose and a clip is provided at the top of the casing for supporting the suction nozzle.

US 5,742,976 shows a vacuum cleaner in which the outer circumference of the main body has a groove for receiving a suction hose. When the hose needs to be stored, the hose is placed in the groove and is held in place by virtue of the distal end latching to the main body.

In the vacuum cleaner shown in US 4,563,789, a suction hose is stored on top of the upper face of the cleaner by coiling the hose several times around the upper face. A connector is provided for securing the two ends of the hose together and thus for retaining the hose on the machine.

US 3,170,185, US 3,480,987 and US 3,651,536 show vacuum cleaners where the suction hose is stored within the main body of the vacuum cleaner. While this solution can neatly store the hose, it requires the main body of the machine to have a chamber which is large enough to accommodate all of the suction hose. This has the disadvantage of increasing the size of the main body of the vacuum cleaner and hence making the machine more cumbersome to manipulate during normal use.

A different solution to the problem of storing the suction hose is proposed in EP 1 011 408, where part of the suction hose is stored within the tube which forms the wand.

The present invention seeks to provide an alternative manner of storing the suction hose on a cleaning appliance.

Accordingly, the present invention provides a cleaning appliance of the cylinder type comprising a main body and a hose for carrying fluid to/from the main body, wherein guide means are located on the main body for guiding the hose along a hose storage path which is a sinuous path around the periphery of the main body.

- Expressed in another way, the hose storage path is non-planar. The height of the hose storage path, above a base of the main body, varies around the periphery of the main body. The sinuous storage path around the main body has an advantage of increasing the
- 5 length of hose which can stored around the main body in comparison with a planar coil of hose around the body. This can increase the storage path sufficiently such that the hose only needs to be looped once around the main body. The sinuous path also has an advantage that the hose can be fitted more closely to the main body since the hose storage path follows the regions where storage space exists on the main body.
- 10 Preferably the hose lies substantially within the envelope of the main body along most of its length, i.e. the hose does not protrude any further beyond the main body than other components, such as the wheels. Preferably, the hose storage path lies above the wheels so that the hose does not need to lie outside the wheels.
- 15 Preferably the guide means also retain the hose to the main body. The guide means can retain the hose at at least one, and preferably at least two, intermediate points along the length of the hose.

Although embodiments of the invention are described in detail with reference to a

20 vacuum cleaner, it will be appreciated that the inventions can also be applied to other forms of cleaning appliance. The term "cleaning appliance" is intended to have a broad meaning, and includes a wide range of machines having a main body and a wand for carrying fluid to or from a floor surface. It includes, inter alia, machines which only apply suction to the surface, such as vacuum cleaners (dry, wet and wet/dry variants), so

25 as to draw material from the surface, as well as machines which apply material to the surface, such as polishing/waxing machines, pressure washing machines and shampooing machines.

30 Embodiments of the invention will now be described with reference to the drawings, in which:

Figure 1 shows a conventional vacuum cleaner of the cylinder type;

Figure 2 shows a vacuum cleaner in accordance with an embodiment of the invention

5 with the flexible hose fitted to the chassis of the cleaner;

Figures 3A and 3B respectively show a side view and a rear view of the vacuum cleaner
of Figure 2 with the hose removed;

10 Figure 4 shows the wand of the vacuum cleaner of Figures 2, 3A and 3B in an extended
state;

Figure 5 shows the wand of Figure 4 in a retracted state for storage;

15 Figure 6 is a cross-section through the wand while stored on the vacuum cleaner of
Figure 2;

Figure 7 is a detailed view of the catch on the wand;

20 Figure 8 is a schematic plan view of the vacuum cleaner showing the storage of the hose;

Figures 9 and 10 are cross-sections of the hose storage channel;

Figures 11A and 11B show the hose location collar on the flexible hose;

25

Figures 12 and 13 show the securing mechanisms on the wand;

Figures 14 to 16 show alternative forms of the wand;

30 Figure 17 shows an alternative form of the main body of the vacuum cleaner;

Figures 18 to 23 show alternative forms of hose retaining schemes for the vacuum cleaner.

- 5 Figure 2 shows a cleaning appliance in the form of a vacuum cleaner. The vacuum cleaner has a main body 100 which supports the main components of the vacuum cleaner. In a traditional manner, the main body 100 has a chassis 110 which supports separating and collecting apparatus 120 and a motor-driven fan (not shown) for generating a suction which can draw dirt laden air into the separating apparatus 120.
- 10 The main body 100 also has two main wheels 112, one on each side of the rear portion of the chassis 110, and a castor wheel 113 beneath the front portion of the chassis 110 which allow the main body 100 to be dragged along a surface. It will be understood that the wheels 112, 113 could be supplemented, or replaced, by other means for allowing the main body 100 to be dragged across a surface, such as skids. The form of the separating apparatus 120 is not important to the invention. While we prefer to use cyclonic separators which spin dirt, dust and debris from the airflow, other forms of separator can be used and examples of suitable separator technology include a centrifugal separator, a filter bag, a porous container, an electrostatic separator or a liquid-based separator.
- 15
- 20 In Figure 2, the separating apparatus comprises two generally cylindrical chambers 121, 122 which lie alongside one another. The chambers 121, 122 are connected to one another by a central spine 123. The separating apparatus 120 is removably mounted on the chassis for emptying and for access to components beneath the separating apparatus.
- 25 A flexible hose 150 and a wand assembly 160 connect to an inlet port 151 on the main body 100. The main body 100 of the cleaner is pulled along by the hose 150 as a user moves around a room. The hose 150 has a construction which is robust enough to withstand this pulling action, and any normal abrasion which may be encountered as the hose rubs against obstacles in a room.

In this embodiment, the air inlet port 151 is centrally mounted on the main body 100 at the forward, lower part of the machine. In alternative embodiments of the machine where the air inlet is not centrally positioned, such as the machine shown in Figure 1 where the inlet is near the upper part of the separating apparatus 11, it is preferable to 5 anchor the hose 150 to the machine at a central position (as with anchor point 25 in the machine shown in Figure 1) so that when a user pulls the hose 150, the main body 100 follows the user.

Ducting on the chassis 110 connects the air inlet port 151 to an inlet to the separating 10 apparatus 120. For a cyclonic separating apparatus 120, the inlet to the separating apparatus is arranged to guide incoming airflow through the wall of the chamber of the cyclonic separator in a tangential manner.

The second end of the hose 150 connects to the wand 160. A suitable wand assembly 15 160 is described in our co-pending International Patent Application PCT/GB02/00850. As shown in Figure 4, the wand comprises a set of three tubes 161, 162, 163 of progressively decreasing diameter. The tubes 161, 162, 163 can telescope inside one another and are retractably housed inside a storage tube 165. The three tubes 161, 162, 20 163 are slideable inside one another and can be moved between a stored position (as best shown in Figure 6) and an extended position (as shown in Figure 4) in which one tube is extended from another such that only the ends of the tubes overlap one another. Securing mechanisms 400 secure the tubes in an extended position, as will be described more fully below. Tubes 161, 162, 163 are progressively longer in length. The length of each tube is chosen so that it fully occupies the available space within the storage tube 25 165 when the securing mechanisms 400 are lying alongside one another.

The distal end of tube 163 has a connector 280 which is adapted to receive a floor tool, such as the floor tool shown 20 in Figure 1, in any known manner. For example, the floor tool can be connected to the tube 163 by means of an interference fit, 30 interconnecting bayonet fittings, snap-fit connections, a screw threaded collar and sleeve,

or by any other suitable means. Accessory tools may also be fitted to the tube 163 in place of the floor tool. A handle 200 is connected to storage tube 165 to allow a user to manipulate the wand 160. Flexible hose 150 extends from one end of the storage tube 165 and is connected to the storage tube 165 by an outlet connector 168 which is 5 rotatable about axis X-X', as shown in Figure 5. This part of the wand is described more fully in our International Patent Application WO 01/50940.

For ease of storage, and ease of carrying, the wand assembly 160 can be fitted to the main body 100 of the vacuum cleaner, as shown in Figures 2 and 3.

10

As best seen in Figure 3A, the length of the storage tube 165 is substantially equal to the length of the part of the main body 100 against which the wand is stored. In this manner, the wand 160 does not protrude too far beyond the main body 100 when it is fully retracted and stored on the main body 100.

15

As best seen in Figure 6, the wand 160 is stored alongside the uppermost surface of the main body 100. Figure 6 shows a cross-section through the wand 160 and the upper part of the separating apparatus 120 taken along the longitudinal axis of the vacuum cleaner. In this embodiment the upper surface of the separating apparatus 120, which itself is 20 releasable from the remainder of the chassis 110 for emptying, is the part of the main body against which the wand 160 is secured. Fittings on the storage tube 165 of the wand assembly cooperate with complementary fittings on the upper surface of the separating apparatus 120 to retain the storage tube 165. The lower end of the storage tube 165 has a hooked projection 220 which extends outwardly from the tube 165. The hook 220 can locate beneath a hook 130 on the separating apparatus 120. This pair of hooks 220, 130 provides some mechanical support for the wand 160 during carrying, and also helps to properly locate the wand 160. The majority of the mechanical support is provided by a locking catch at the other end of the storage tube 165. The locking catch 25 comprises a movable catch ring 222 with a catch face 225 and is shown in more detail in Figure 7. The catch face 225 locates beneath another hook 135 on the upper face of the

separating apparatus 120. The locking catch mechanism comprises a catch ring 222 which is pivotably mounted about the outside of the storage tube 165 about pivot point 223. The lower part of the catch ring 222 carries a catch face 225 for engaging with the main body. The catch ring is biased, by spring 241, into the locked position shown in 5 Figures 5 and 6. An actuator member 235 is pivotably mounted to the storage tube 165 about pivot point 236. The actuator member 235 has a part which serves as a button 230 which can be operated by a user. The actuator member is biased by a spring 242 into the position in which it lies alongside the tube, as shown in Figures 2, 3A, 5 and 6. Actuator member 235 has an arm 237 on each of its sides, the end of the arm 237 10 locating within a notch 238 on the catch ring 222. In use, movement of the actuator member 235, by a user pressing button 230 in clockwise direction 239, causes arm 237 to urge catch ring 222 in an anti-clockwise direction about pivot point 223 to release catch 225. Actuator member 235 also has two further locking functions which are simultaneously achieved when button 230 is pressed. Firstly, the furthest end of the 15 actuator member has a hook 231 which can engage with the connector 280 on the end of the tube 163. When all of the tubes 161, 162, 163 have been retracted into the storage tube 165, connector 280 lies alongside the end of storage tube 165 and hook 231 can hook onto connector 280. All of the tubes 161, 162, 163 are held securely within storage tube 165 until the actuator member 235 is operated to release the hook 231. The 20 leading edge of hook 231 has an inclined face which can be displaced by the leading edge of connector 280 as the tubes are retracted inside the storage tube 165. This allows the hook 231 to automatically ride onto, and thus retain, the cap 280 as the tubes are moved towards a stored position. Connector 280 has a cap which, in the stored position (best shown in Figure 6) accommodates all of the securing mechanisms 400 of the tubes and 25 thus serves to protect them from damage during storage.

Another feature of the locking mechanism is that projection 232 on the actuator member 235 can seat itself in a depression in the wall of tube 161 to lock the position of tube 161. Operating the actuator member 235 raises the projection 232 from its seated 30 position and thus allows tube 161 to be moved. Tube 161 has a series of similar

depressions 233 along its length. Projection 232 also serves to secure the tube 161 in a desired extended position with respect to the storage tube 165.

It will be appreciated that operation of the single button 230 simultaneously releases the 5 wand 160 from the main body 100 of the vacuum cleaner, releases the end connector 280 which in turn allows the tubes 161, 162, 163 to be withdrawn from the storage tube 165, and locks tube 161 in a selected extended position.

The method of operating the vacuum cleaner will now be described. To store the wand a 10 user brings the storage tube 165 of the wand assembly, in its fully retracted state, alongside the uppermost face of the main body 100 and engages the hooked projection 220 behind hook 130 on the main body. The user then pivots the storage tube 165 towards the main body so that the catch face 225 engages with the hook 135 on the main body. The inclined shape of the catch face 225 causes the catch ring to move away from 15 the hook 135, against the bias of the spring, as the storage tube is pushed against the main body, and to reseat itself beneath the hook 135. At this point the wand 160 is now fully locked in position on the main body 100 and a user can then use the handle 200 on the storage tube 165 of the wand assembly to carry the vacuum cleaner.

20 A floor tool can be left in place on the end of the wand 160 or it can be removed and stored elsewhere on the main body 100.

To release the wand 160 from the storage position, a user operates the button 230 to move catch ring 222 and catch face 225. This releases the catch face 225 from the hook 25 135. The user can then pull the wand 160 away from the main body and slide the wand upwards, to remove the hooked projection 220 from the main body 100.

The position in which a user will naturally feel comfortable grasping the handle 200 to lift 30 and carry the vacuum cleaner is different to the position in which a user will wish to grasp the handle 200 to operate the wand for cleaning. In this embodiment, the handle

- 200 extends for some distance along the length of, and parallel to, the longitudinal axis of the storage tube 165 so as to provide the user with comfortable, longitudinally offset, positions for both carrying the vacuum cleaner and operating the wand for cleaning. Portion 205 of the handle, adjacent the end of the storage tube 165, is intended to be
5 used to manipulate the wand during normal cleaning. Portion 205 lies at an angle to the longitudinal axis of the storage tube. This angled position, together with the position adjacent the end of the storage tube, has been found to be a comfortable position for manipulating the wand. Portion 208 of the handle is intended to be used to carry the cleaner. Control buttons for operating the vacuum cleaner can be provided in region
10 207. These controls can include an on/off switch, a suction power control etc. as is well known in the art. A bleed valve 209 is also located near to the part of the handle 205 which is used during cleaning. The bleed valve admits air when the trigger 209 is pulled, so as to reduce the suction force at the remote end of the wand.
- 15 The hooked projection 220 on the storage tube 165 and hook 130 on the main body both extend for some distance perpendicularly to the longitudinal axis Y – Y' of the storage tube 165. This helps to minimise any rotational movement, or wobble, of the wand about its longitudinal axis. While the hooked projection 220 and catch ring 222 adequately secure the wand to the main body 100, it is preferred to add some further
20 features to the wand 160 and the main body for additional security. Ribs 250 extend radially outwardly from each side of the storage tube 165. Ribs 251 also extend outwardly from the upper face of the separating apparatus 120 at positions adjacent to where the storage tube 165 will lie when it is secured to the main body. The ribs serve to minimise any rotation of the storage tube 165 about its longitudinal axis Y-Y' when the
25 tube is secured to the main body. In short, they minimise 'wobble'. A second rib 255 projects outwardly from the storage tube 165, perpendicularly to the longitudinal axis Y-Y' of the storage tube 165. This locates against a similar rib 125 on the main body 100 and serves to minimise movement of the storage tube 165 in the direction of the longitudinal axis of the tube 165.

In this embodiment, the separating apparatus 120 comprises two cylindrical chambers which lie alongside one another on the main body 100. The hooks 130, 135 are formed on the inlet duct structure which lies between the chambers. This allows the wand 160 to fit more snugly against the main body and helps to reduce the amount by which the 5 wand 160 protrudes beyond the envelope of the main body.

The hose 150 can be stored around the main body 100 of the vacuum cleaner. The hose 150 has a length which is sufficient such that, in use, the main body 100 can sit on a floor surface and the user can manipulate the wand at a convenient height, without any 10 excessive drag. In our embodiment the hose has a length of around 1.5m and a length in the range 1.3 – 1.8m is typical. Conveniently, the hose 150 also has a length which is sufficient to lie once around the perimeter of the main body 100. The hose inlet 151 to the main body 100, as well as being centrally located for ease of pulling, lies below the position where the hose end 168 of the wand 160 will lie when the wand 160 is stored on 15 the main body 100. This allows the hose 150 to form one complete perimeter of the main body 100. Hose retaining features 310 on the main body allow the hose 150 to remain attached to the main body 100 during carrying and during storage.

In the embodiment shown in Figures 2 and 3 a single continuous hose receiving channel 20 300 is provided along the sides and back of the periphery of the chassis 110. Figure 2 shows the hose 150 in place in the channel 300 and Figures 3A and 3B show the hose removed from the channel 300.

Along most of its length, channel 300 has a semi-circular shape and a diameter which is 25 just greater than the hose 150 that it retains, as shown in Figure 9. This part of the channel 300 defines the storage path for the hose 150 and serves to guide and support the hose 150 when it is stored. At each end the channel 300 there is a hose retaining part 310 which is capable of grasping the hose 150. The hose retaining parts 310 have a shape which is greater than a semi-circle, i.e. the channel extends around greater than 30 half of the circumference of the hose 150. As shown in the cross-section of Figure 10,

hose retaining parts 310 have two leading edges 311, 312. The channel, or at least the hose retaining parts 310 of the channel, are formed from a material, such as polypropylene, which is sufficiently resilient to allow the leading edges 311, 312 to be prised apart to form an opening with a width which is at least equal to the diameter of 5 the hose 150. The material should also be capable of withstanding repeated flexing of this kind over the lifetime of the machine. The entire channel 300, the hose retaining parts 310, or even just the leading edges 311, 312 of the channel can be formed from the resilient material, with the remainder of the channel being formed of a more rigid material. This shape of hose retaining parts 310 allows the hose, once it is fitted within 10 the channel 300, to remain clasped by the leading edges of the channel. The hose can be removed from the channel 300 by applying a force to the hose which is sufficient to overcome the retaining force of the leading edges 311, 312 of hose retaining parts 310. Thus, the hose 150 can be removed in a one handed operation. In a more elaborate 15 alternative scheme, the leading edges 311, 312 of the hose retaining parts 310 can be provided with finger grips by which a user can, with one hand, prise the leading edges apart while the user, with their other hand, pulls the hose 150 from the channel.

While a semi-circular shaped channel is preferred, as it provides continuous support around the hose, the channel could have any shape which provides support at a plurality 20 of points around the hose, e.g. a square or other polygonal shaped structure. Alternatively, a set of ribs can project outwardly from the chassis 110 to define supports for the hose 150. The channel 300 can be integrally formed with the remainder of the main body or it can be formed as a separate part which can then be mounted on the main body during assembly of the machine. The channel 300 can be removably mounted to 25 the chassis 110 so that, if a user does not want this feature they can simply remove the channel 300 from the chassis 110.

The hose 150 has a length which is greater than the perimeter of the main body 100. The main reason for this is to allow some slack around the inlet 151 to the main body and at 30 the hose end 168 of the wand 160 since an excessively tight bend in these regions would

cause damage to the hose. If the hose 150 were to be stored with a tight bend, it could suffer permanent deformation and kinking. Having a hose 150 which is longer than the perimeter of the chassis 110 can result in a user incorrectly fitting the hose 150 to the main body 110. In particular, a user could fit the hose 150 too tightly to the main body 5 at end 151, which would result in an unacceptably tight bend in this region, leaving a large loop of hose at the other end 168 which could hang below the main body 110. In order to instruct a user where to correctly fit the hose 150, hose 150 is provided with a collar 350 which is wider than the diameter of channel 300. This collar 350 is shown in Figures 11A and 11B. The collar 350 serves as a guide for informing a user where to 10 begin fitting the hose 150 into channel 300. As well as visually indicating the correct position for fitting the hose 150, it can be readily located (felt) by a user. Because collar 350 is wider than channel 300, that part of the hose on which collar 350 is fitted cannot be fitted inside the channel. Thus, the hose 150 simply cannot be fitted with an unacceptably tight bend in the region of inlet 151 or wand connector 168. Collar 350 15 comprises a first collar 351 which has a plurality of radially inwardly extending ribs for engaging with the spaces between ribs on the hose 150. The first collar 351 can be formed as two semi-circular parts which are fitted to the hose 150 by snapping them around the hose in the desired position. A second collar 352 fits around the first collar 351 and holds the two semi-circular halves of collar 351 in place. A small bump feature 20 353 on the outer surface of first collar 351 corresponds to a small depression on the inner face of second collar 352.

Channel 300 has a shape which causes the hose 150 to follow a sinuous path around the main body 100 of the machine. Expressed another way, the hose storage path is non-planar. From Figures 2, 3A, 3B and 8 it can be seen that the hose 150 begins at the front, lower part of the main body 100, curves around the front of the machine, over the top of the first wheel 112, fitting within the envelope of the machine. After closely 25 following the shape of the wheel, and closely fitting alongside the separating apparatus 120, the hose 150 passes, along a generally convex shaped path beneath a tool storage 30 area on the rear of the machine. On the other side of the machine the hose follows the

same path, before following a gently curving path to the wand connector 168. This layout not only allows the hose 150 to fit neatly within the overall envelope of the machine, but it increases the length of the path, compared to a coil which lies in a single plane, thus increasing the length of hose 150 which can be accommodated. It is noted
5 that the ends of hose 150 are held in position by virtue of connection 151 to the main body and connection 168 to the wand.

The wand 160 itself will now be described in more detail.

10 Securing mechanisms 400 are capable of either locking the tubes 161, 162, 163 to one another, as is needed when the tubes are in an extended position, or allowing free movement of the tubes with respect to one another, as is needed when the tubes are being retracted. A securing mechanism 400 is provided at the distal end of tube 161 for securing tube 161 to tube 162 and a further securing mechanism 400 is provided at the
15 distal end of tube 162 for securing tube 162 to tube 163. The securing mechanisms 400 automatically lock the tubes, as they are brought to their fully extended position, and automatically unlock as the tubes are retracted.

20 The detail of these securing mechanisms is not important to the invention. However, for completeness, one embodiment will now be described with reference to Figures 12 and 13. Tubes 162, 163 represent two adjacent stages of the wand 160.

25 The securing mechanism 400 comprises a ring 410 which fits around the outside of tube 162. The ring 410 comprises a plurality of arms 459 which are connected to, and extend axially rearwardly from, the ring. Between each arm 459 is an arc-shaped part which fits alongside the outer surface of the tube 162. Each of the arms 459 have a radially inwardly extending projection 454 which locates within an aperture in the wall of the tube 162. The arms 459 are pivotable about the ring and the securing mechanism is manufactured from a material which is sufficiently resilient to permit it to flex outwardly
30 and return to the position shown without breaking.

Tube 163 has an inclined surface 470 which serves to move the projections 454 radially outwards as the tubes are brought into an extended position, the projection seating itself in the aperture 420 in the wall of tube 162 and locking the tubes.

5

To release the tubes 162, 163, the arms 459 flex radially outwardly, pivoting about the ring. This carries the arm 459 sufficiently radially outwardly such that the projection 454 lies radially outside the aperture 420 in the tube. The forward inclined surface 452 of one securing mechanism 400 presses against the rearward surface 456 of another 10 securing mechanism 400 to cause the arm to move in this radial fashion.

A seal 460 is provided on each tube for sealing against another tube. The seal 260 is located at one end of tube 30 and is secured to the inner surface of the tube. The seal 260 can be bonded or clipped in place.

15

It is preferable for the wand to be lockable with a range of different overall lengths such that users who differ in their physical dimensions (height, arm length) can comfortably use the wand. To satisfy this requirement, the uppermost tube 161 is provided with a set of locking positions, as shown in Figure 6. Conveniently, these locking positions are 20 provided as notches 233 in a ridge which runs along the length of tube 161.

The tubes can be manufactured from a metal such as steel or aluminium, or even a robust plastic material. The tubes are preferably formed from a material of constant thickness, the ridges and channels being formed by shaping the tube. This has the advantage of 25 minimising the weight of the finished product.

In the above embodiment, the securing mechanisms are manufactured from a resiliently flexible material such as a nylon compound. However, an equivalent pivotal movement of the arms can be achieved by manufacturing each arm as a separate part and providing 30 a pivot between each arm and the remainder of the securing mechanism. The resilience

of the arm can be achieved by mounting a spring between the arm and the tube or between the arm and a fixed part of the securing mechanism.

While the above described embodiments show the securing mechanisms 400 as being a separate part from the tubes, a securing mechanism could be manufactured integrally with a tube. A plastic securing mechanism could be moulded (or otherwise formed) around a metal tube, or a plastic securing mechanism could be moulded (or otherwise formed) with a plastic tube.

- 10 The operation of the wand will now be described. To extend the wand 160, a user holds storage tube 165 by handle 200 and pulls the narrowest tube 163 axially away from the storage tube 165. Each of the tubes 161, 162, 163 slides outwardly from the storage tube 165. As each tube reaches an extended position with respect to another tube, for example, as tube 163 slides towards the position with respect to tube 162 shown in
15 Figure 12, the tubes automatically lock in this position.

The procedure for collapsing the wand 160 will now be described. A user firstly operates release button 230 on storage tube 165. This releases the catch 232 from tube 161. A user pushes the distal end of tube 163 axially towards the storage tube 165. This
20 causes tube 161 to slide within storage tube 165. Once tube 161 has been fully retracted inside the storage tube 165 the securing mechanism 400 pushes against the leading edge of the storage tube 165 and causes the arms of the securing mechanism 400 to flex radially outwardly, thus unlocking tube 162 from tube 161. Tube 162 then retracts inside the storage tube 165. The complete wand retraction can be performed in one
25 continuous, swift movement without the need for a user to separately operate each securing mechanism 400.

The wand which is shown here has three separate tubes or stages, in addition to a storage tube 165, but it will be appreciated that the wand could have only two stages or

a higher number than three. Each additional stage would have the same type of securing mechanism 400.

Alternatives

5 Handles

In the previously described embodiment, a single handle 200 is provided which serves for both normal cleaning and carrying. In an alternative embodiment, as shown in Figure 14, a first handle 600 is provided for use during cleaning and a second, separate, handle 605 is provided for carrying the vacuum cleaner.

10

Another alternative is shown in Figure 15 where a single handle is movable between a first position, for use in carrying the machine, and a second position for use during normal cleaning operations. The handle is pivotable between the two positions and is positively retained in each of the positions. This retention of the handle can be by a locking mechanism which is automatically operated as the handle is moved into the new position, and which is manually released, such as by a user operating a trigger, to release the handle from that position.

15 In another alternative shown in Figure 16 there is no handle as such for manipulating the wand. Instead, an angled conduit 610 is rigidly (non-rotatably) fixed to the end of tube 165 and this angled conduit 610 serves as a part by which the user can manipulate the wand. The angled conduit 610 can be shaped to provide a comfortable gripping surface, or it can be overlaid by a material which makes the conduit more comfortable to hold. In a still further embodiment, not illustrated, the carrying handle can be omitted altogether.

20 25 In this case, the main body can be provided with an alternative carrying handle.

Wand storage

In the main embodiment the wand 160 is secured to the main body 100 such that a fairly large proportion of the storage tube 165 of the wand sits above the remainder of the 30 main body 100. It is possible to increase the size of the retaining channel 660 for

receiving the wand, as shown in Figure 17. In this alternative embodiment the receiving channel 660 has a sufficient depth 661 to fully receive the storage tube 165 of the wand, with only the carry handle 200 protruding above the upper surface of the main body 100.

5 **Hose storage channels**

- The main embodiment described above has a single continuous channel 300 with hose retaining features 310 at each end. There are a number of alternatives to this. As an alternative to providing a single continuous channel 300, there can be multiple, shorter length, channels around the main body. Each of these channels can be provided with a
- 10 hose retaining function, or just the channels at each end of the set of channels can be provided with this function, the other channels simply serving to define the hose storage path around the main body and to provide a support surface against which the hose 150 can rest, similar to portion 305 of the channel 300.
- 15 In an alternative embodiment, the entire channel can have a hose retaining function. Looking again at Figures 2 and 3, this would be achieved by extending the leading edges 311, 312 all the way along the channel. Thus, the channel would have generally the same cross-section all the way along its length.
- 20 The channel can be integrally formed with the remainder of the chassis, as shown in Figure 18, or it can be formed as a separate part which can then be mounted on the chassis during assembly of the machine. The channel can be removably mounted to the chassis so that, if a user does not want this feature they can simply remove the channel from the chassis.
- 25 A preferable enhancement is for each end of the channel to have a flared cuff. This permits easy insertion of the hose into the channel. Once a first part of the hose has been inserted into the cuff, a user only needs to push the hose inwardly into the channel to prise the leading edges of the channel apart.

The hose retaining function can be achieved with other types of mechanism. Figure 19 shows individual clips 680 fitted to the periphery of the chassis 110 of the main body. There can be a single clip 680 on each side of the main body, or a number of such clips positioned along the intended hose storage path around the periphery of the main body.

5

Another form of clip is shown in Figure 20. This is in the form of a clip which can be manually opened or closed. There is a generally semi-circular (or other) shaped support part 650 and a second part 652 which is hingedly connected to the first part 650 or directly to the chassis 110. Part 652 is operable between an open state, in which part 10 652 opens far enough to allow hose 150 to be inserted into, or removed from, the clip and a closed state, in which the hose 150 is held against part 650. An alternative form of clip would have a pair of arms, each being hinged 655 to a side of support part 650. The arms can extend fully around the hose so as to meet in the middle or can extend only partially around the hose 150. Preferably each arm is sprung loaded (e.g. by a sprung 15 hinge) such that it rests firmly in both the open and closed states. Alternatively, an additional latch can hold the pair of arms together once they are brought into the closed position.

Another form of retaining mechanism is shown in Figures 21 and 22. A plurality of 20 storage rings are positioned around the periphery of the main body 100. The storage rings can be formed of a rigid material or they can be formed of a resilient material, such that ring 690 can be stretched open to receive the hose 150, and return to a position where it fits snugly around the hose 150. Conveniently, the rings 690 can be formed from a rubber compound. To retain the hose 150 on the main body 100, the hose 150 is 25 fed through each of the rings 690 in turn. This is a less desirable solution to what has previously been described as it requires the hose to be separated from the wand to allow the hose 150 to be fed through the set of rings. After feeding the hose through the rings the hose can be connected, once again, to the wand.

In each of these alternative schemes the clips or rings can be fitted to the main body in the same winding path around the body as the hose storage channel of the main embodiment so as to cause the hose 150 to be stored in a sinuous path around the body.

- 5 In a still further alternative scheme, shown in Figure 23, the hose 150 is not held in place by clips or a channel which grasps the hose 150. Rather, the hose 150 is held under tension by hooks 681, 682, 683 positioned around the chassis 110 of the main body 100. The hooks 681, 682, 683 are each positioned on the inside of each turn along the path around the body. They define the storage path around the body and they support the
- 10 hose 150. Each ring has a curved support surface on which the hose 150 can lie. Hook 681 is positioned above the wheel 112, hook 682 is positioned on the rear of the chassis to define the path along the rear of the chassis, and hook 683 is positioned in the same way as hook 681, but on the other side of the chassis 110. It is noted that the ends of
- 15 hose 150 are held in position by virtue of connection 151 to the main body and connection 168 to the wand.

In each of these embodiments the hose storage path is symmetrical about the longitudinal axis of the main body of the machine. This results from the symmetrical nature of the main body, the machine being symmetrical for good steerability. However, it will be

20 readily understood that there is no need for the storage path on one side to be the same as that on the other side, and the hose storage path can be adapted to fit within available space on each side of the machine.

Hose location collar

- 25 In the main embodiment, a collar 350 is fitted around the hose 150 to instruct a user where to fit the hose 150 into the retaining channel. The collar 350 is larger than the hose retaining channel 305 or retaining parts 310. It will be appreciated that shapes of collar, other than a cylindrical collar, could be provided, and additional tactile features such as ribs, or bumps, can be added to the outer surface of the collar 350 to aid a user.
- 30 Figures 24 - 26 show a range of alternative schemes for instructing a user where to fit

the hose 150 around the main body 100 of the cleaning appliance. In Figures 24 and 25 the hose storage channel and hose location fitting have a corresponding shape which serves to instruct a user where to fit the hose. In Figure 24 the mating shapes are provided by surface 361 at the end of the storage channel 360, and by surface 362 on 5 collar 365 on the hose 150. In Figure 25 ring-shaped cavities 372 are formed at an intermediate position along the storage channel 370. Ring-shaped fittings 371 on hose collar 375 fit within the cavities 372 on storage channel 370.

In addition to mechanical fittings to the hose 150, there are a range of solutions for 10 visually instructing a user where to fit the hose. These can include a pattern, such as arrows or stripes, or simply coloured markings on the hose. The visual markings can be incorporated into the hose itself or they can be applied after manufacture, such as by applying a label or transfer to the outside of the hose or by painting the hose. Figure 26 show visual markings 378, 379 on collar 350 and the end of storage channel 380.

Claims

1. A cleaning appliance of the cylinder type comprising a main body and a hose for carrying fluid to/from the main body, wherein guide means are located on the main body 5 for guiding the hose along a hose storage path which is a sinuous path around the periphery of the main body.
2. A cleaning appliance according to claim 1, wherein the height of the hose storage path, above a base of the main body, varies around the periphery of the main body.
10
3. A cleaning appliance according to claim 1 or 2, wherein the main body comprises a pair of wheels which are mounted on the sides of the main body and wherein the guide means are located on the main body such that the hose storage path lies around at least part of the wheels.
15
4. A cleaning appliance according to claim 3, wherein the guide means are located on the main body such that the hose storage path lies above the wheels.
5. A cleaning appliance according to claim 3 or 4, wherein the guide means are 20 located on the main body such that the hose storage path is closer to the base of the main body at the front and back of the main body, the hose storage path increasing in height from the base of the main body in the region of the wheels.
6. A cleaning appliance according to any one of the preceding claims, wherein the 25 guide means are located on the main body such that the hose storage path extends once around the periphery of the main body.
7. A cleaning appliance according to any one of the preceding claims, further comprising a first connector for connecting a first end of the hose to the main body and a 30 second connector for connecting the second end of the hose to a wand, and wherein the

first connector is located on the main body at a position which is adjacent the position of the second connector when the wand is retained on the main body such that the hose can be stored by wrapping the hose once around the entire periphery of the main body.

- 5 8. A cleaning appliance according to any one of claims 1 to 5, further comprising a first connector for connecting a first end of the hose to the main body and a second connector for connecting the second end of the hose to a wand, and wherein the first connector is located on the main body at a position which is at an opposite end of the main body to the position of the second connector when the wand is retained on the main
- 10 body such that the hose can be stored by wrapping the hose one and a half times around the entire periphery of the main body.

9. A cleaning appliance according to any one of the preceding claims, wherein the guide means comprises a channel which extends at least part way around the periphery of the main body and defines the hose storage path.

10. A cleaning appliance according to any one of the preceding claims, wherein at least part of the guide means can also retain the hose on the main body.

- 20 11. A cleaning appliance according to claim 10, wherein the guide means comprises a channel which extends at least part way around the periphery of the main body and at least one portion of the channel is arranged to retain the hose.

- 25 12. A cleaning appliance according to claim 11, wherein each end portion of the channel is arranged to retain the hose.

13. A cleaning appliance according to claim 11 or 12, wherein the entire length of the channel is arranged to retain the hose.

14. A cleaning appliance according to claim 10, wherein the guide means comprise at least one clip which is positioned along the hose storage path.

15. A cleaning appliance according to claim 14, wherein the clip is movable between 5 a closed position, in which it retains the hose, and an open position in which it can receive or release the hose.

16. A cleaning appliance according to any one of the preceding claims, wherein the guide means comprise a set of hooks which are positioned on the inside edge of changes 10 in direction along the hose storage path.

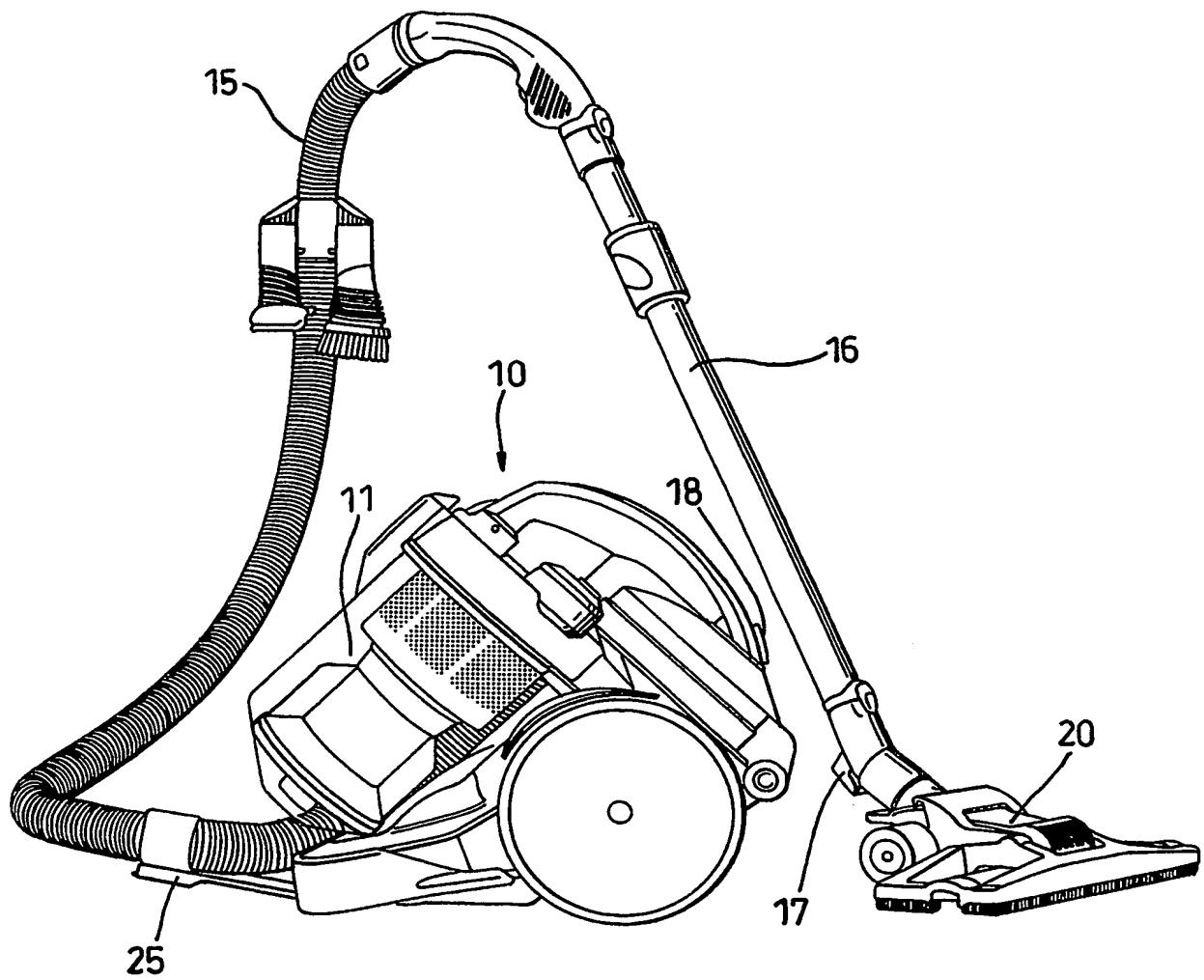
17. A cleaning appliance according to any one of the preceding claims, wherein the guide means are formed integrally with the main body.

15 18. A cleaning appliance according to any one of claims 1 to 16, wherein the guide means are removably mounted on the main body.

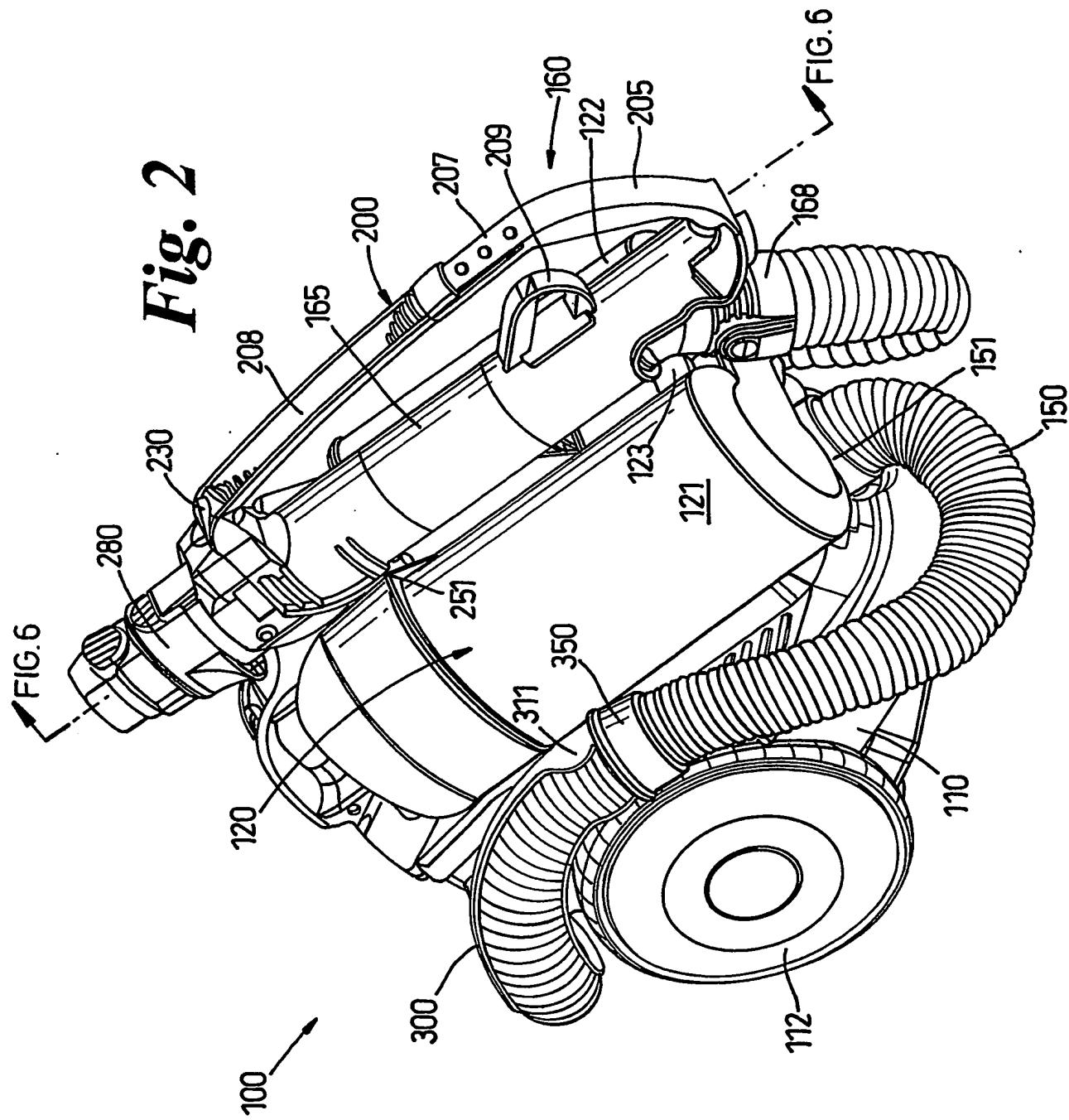
19. A cleaning appliance according to any one of the preceding claims, wherein the hose has a length which is greater than the hose storage path around the main body, and 20 wherein the hose comprises locating means for identifying the portion of the hose which is to be retained on the main body.

20. A cleaning appliance substantially as described herein with reference to the accompanying drawings.

1/16

*Fig. 1*

2/16



3/16

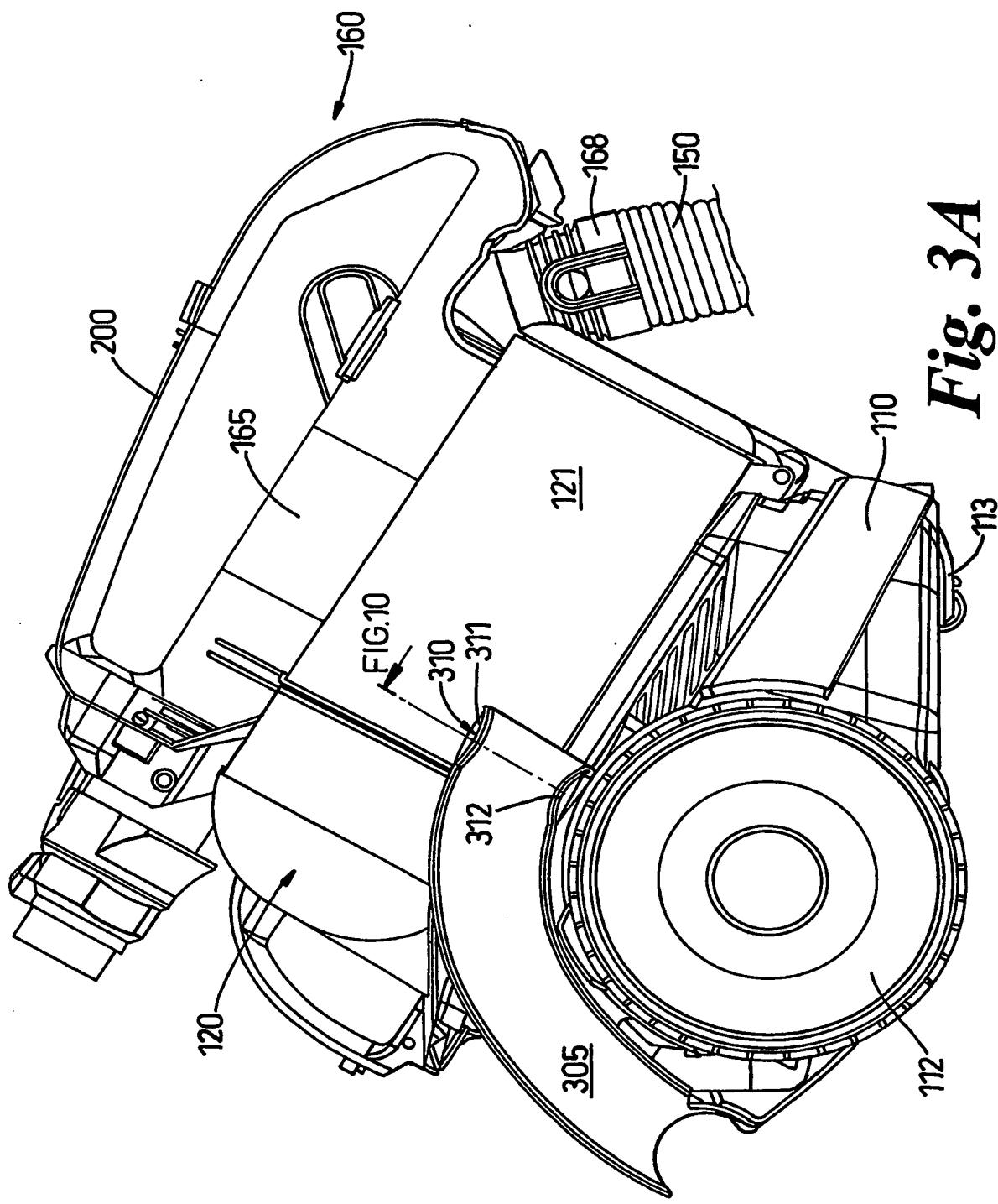


Fig. 3A

4/16

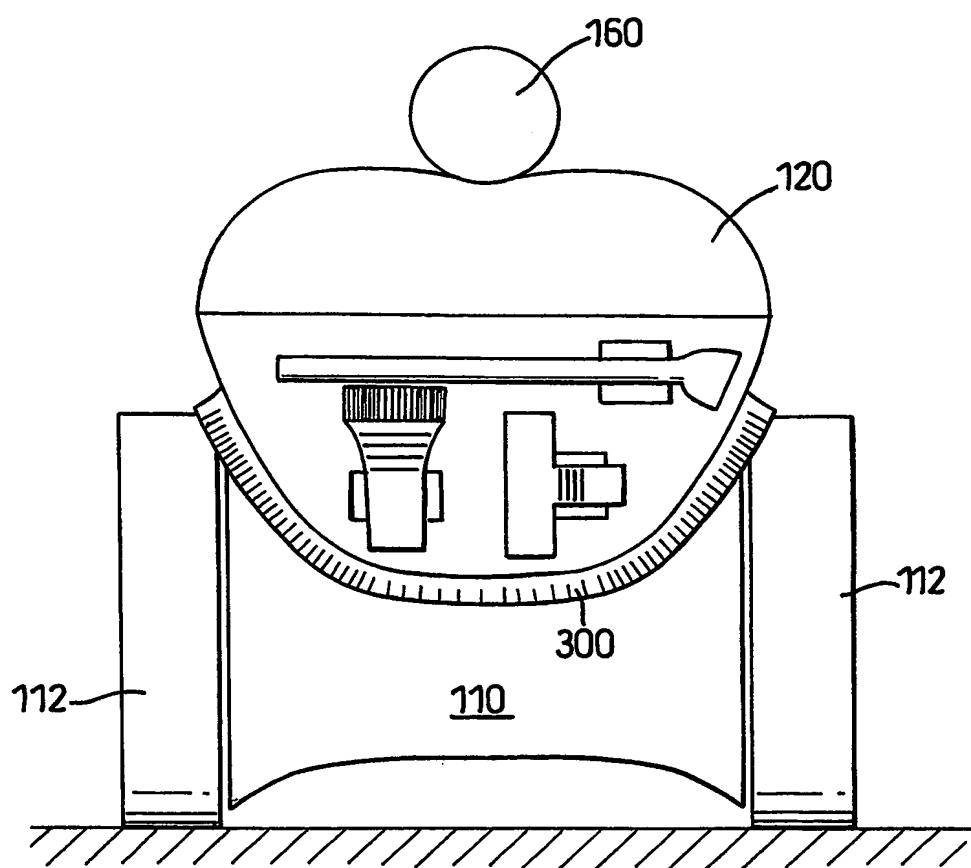


Fig. 3B

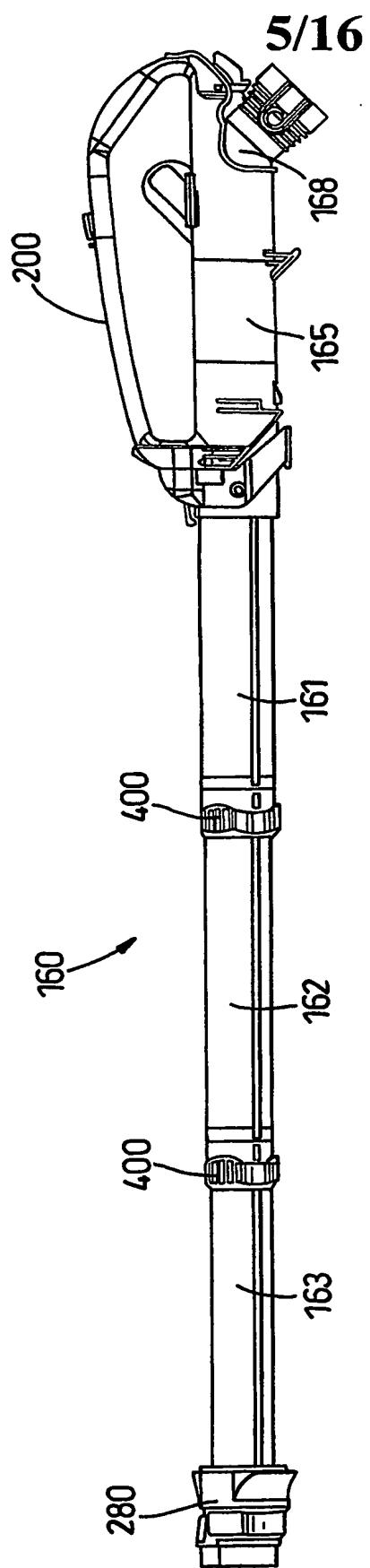


Fig. 4

6/16

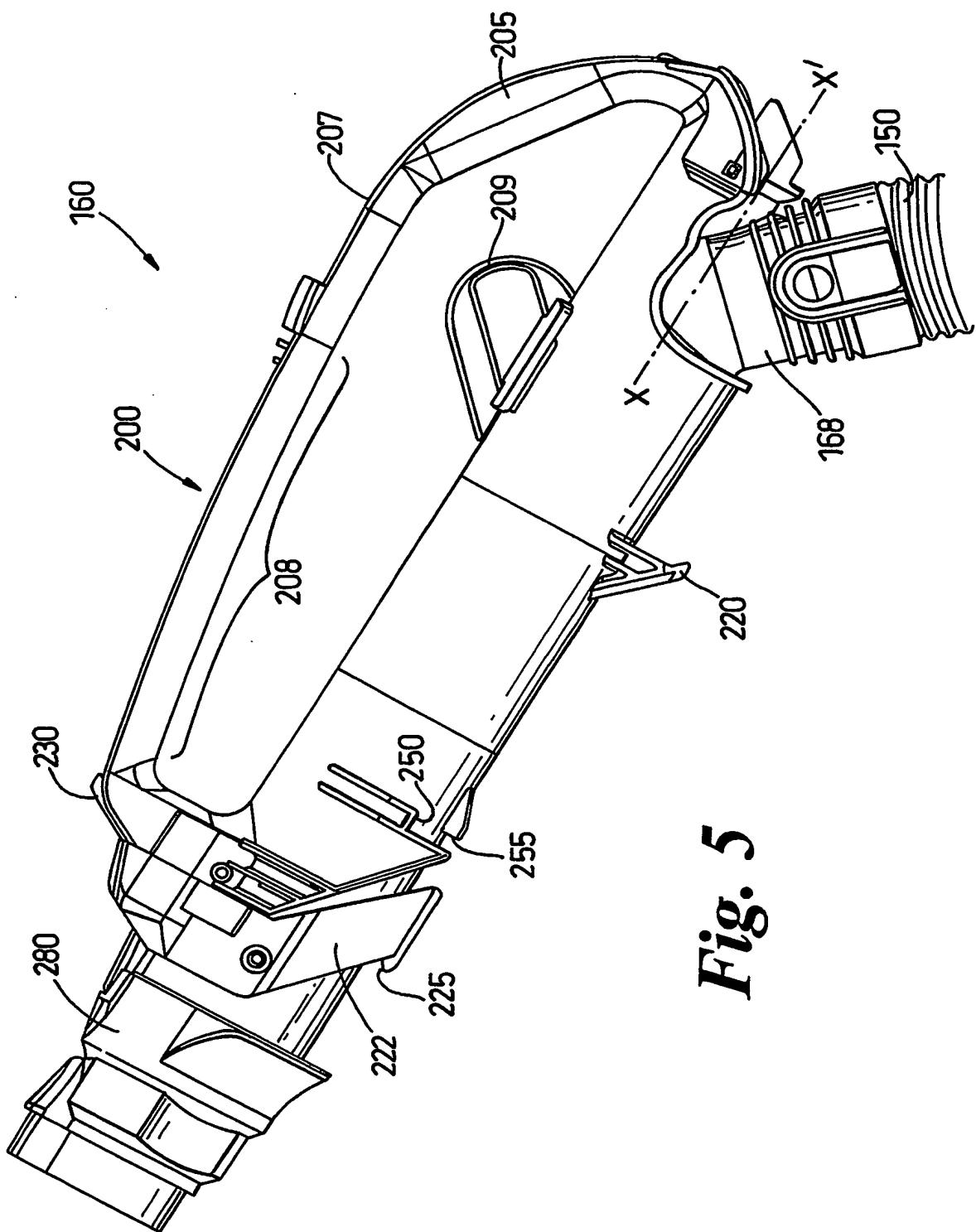


Fig. 5

7/16

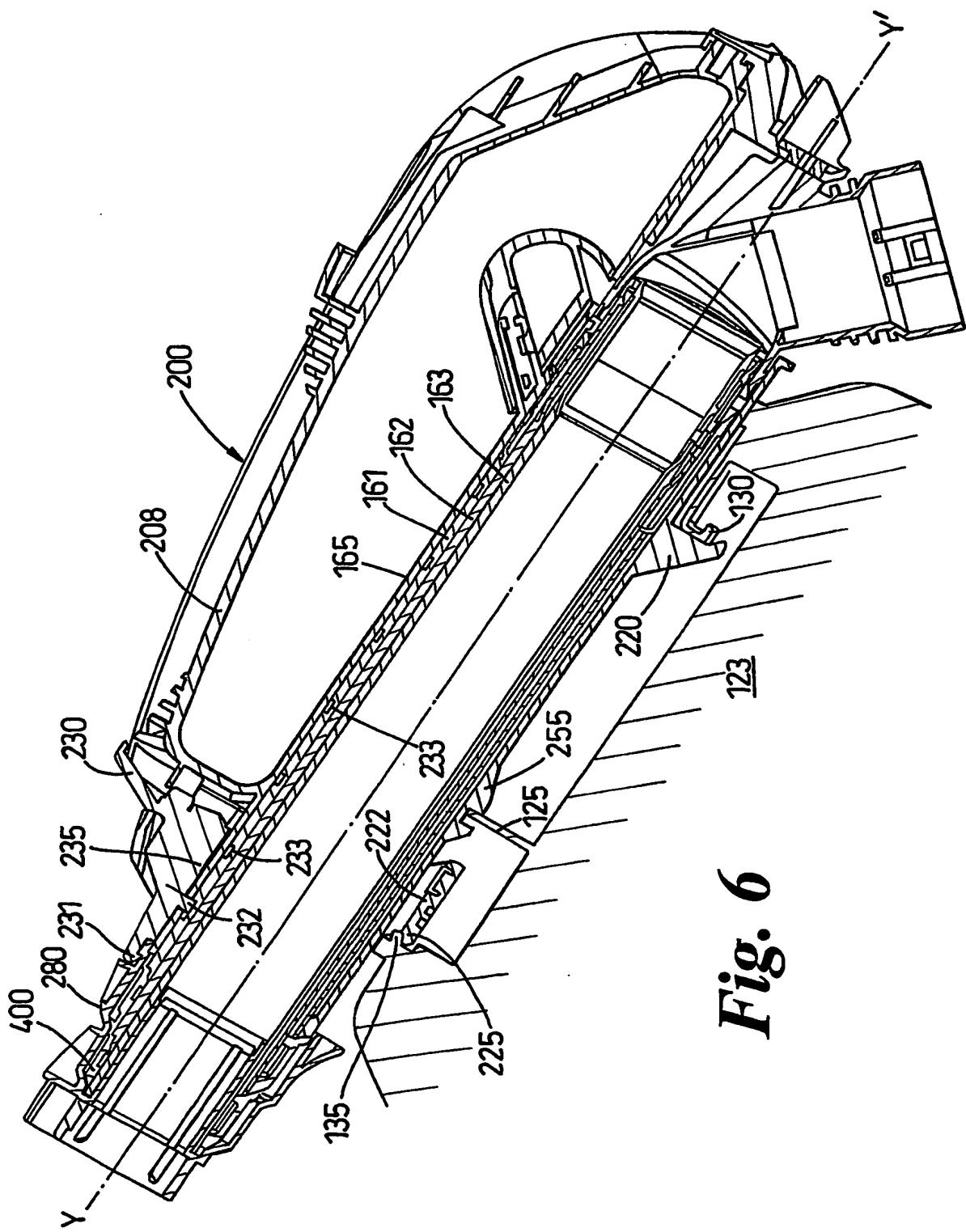


Fig. 6

8/16

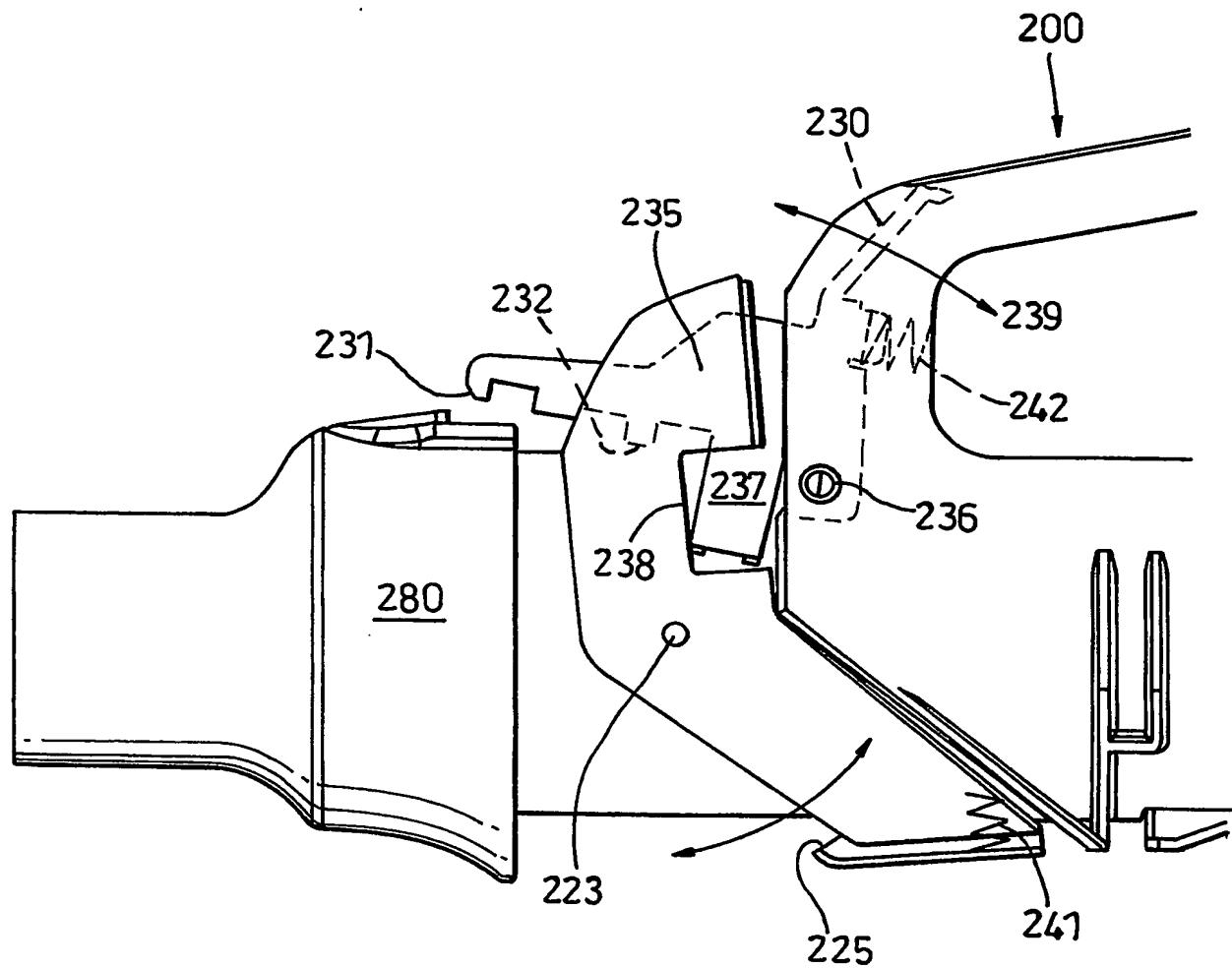
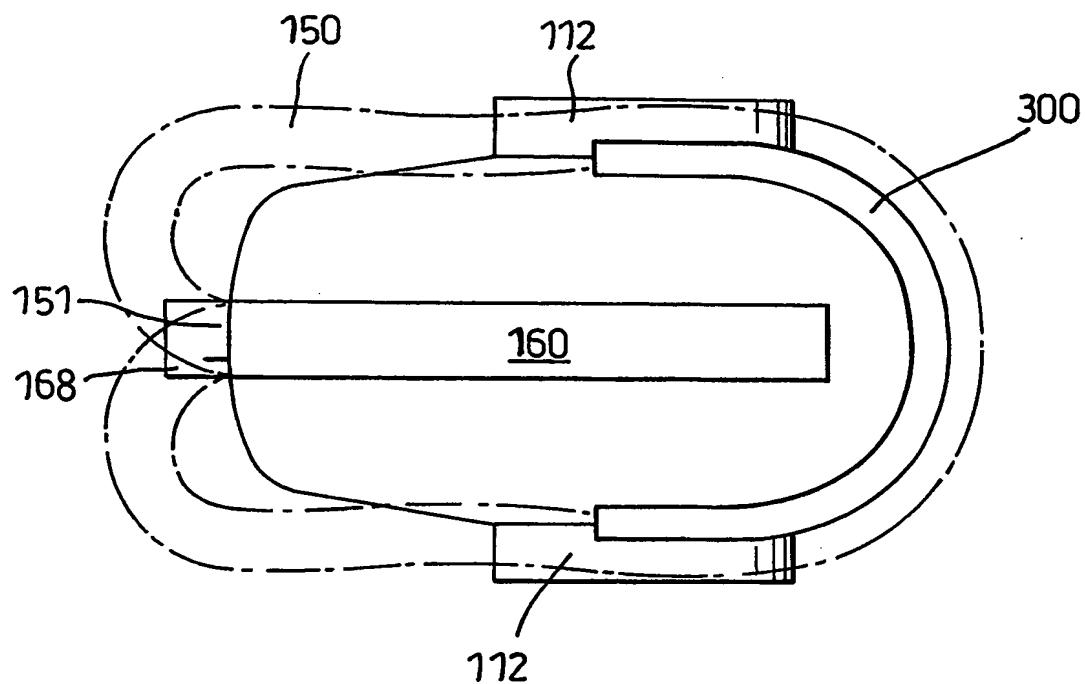
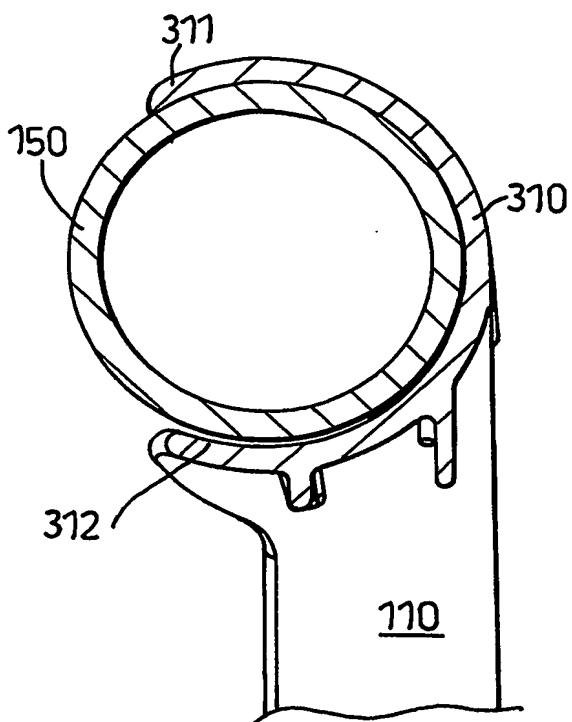
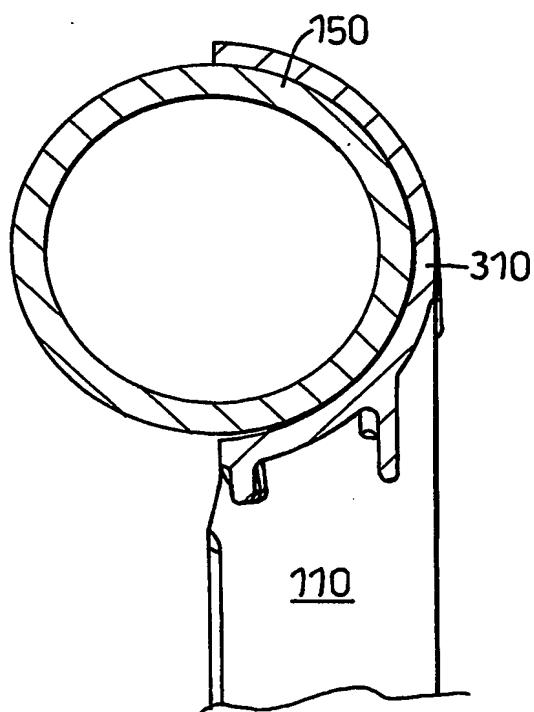
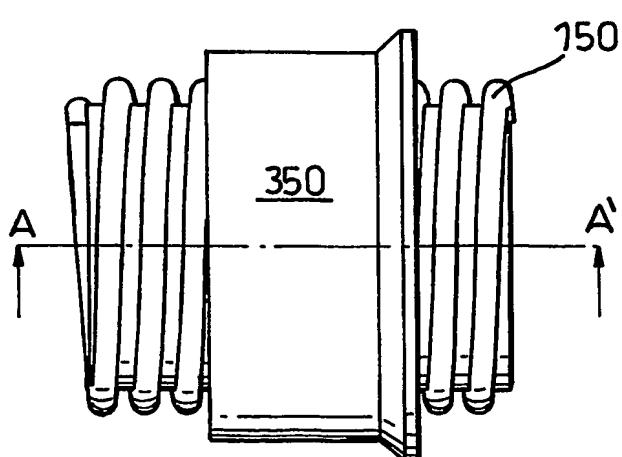
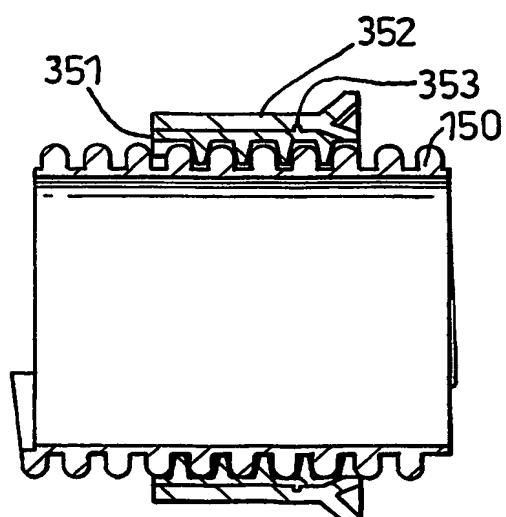


Fig. 7

9/16***Fig. 8***

10/16**Fig. 9****Fig. 10****Fig. 11A****Fig. 11B**

11/16

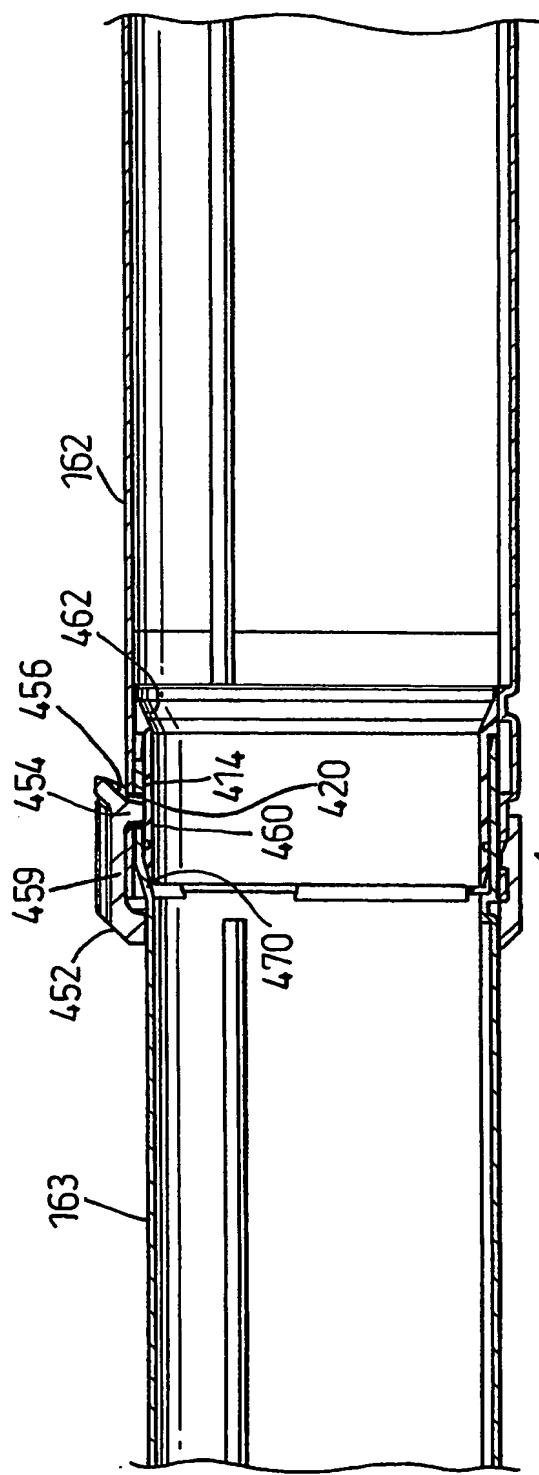


Fig. 12

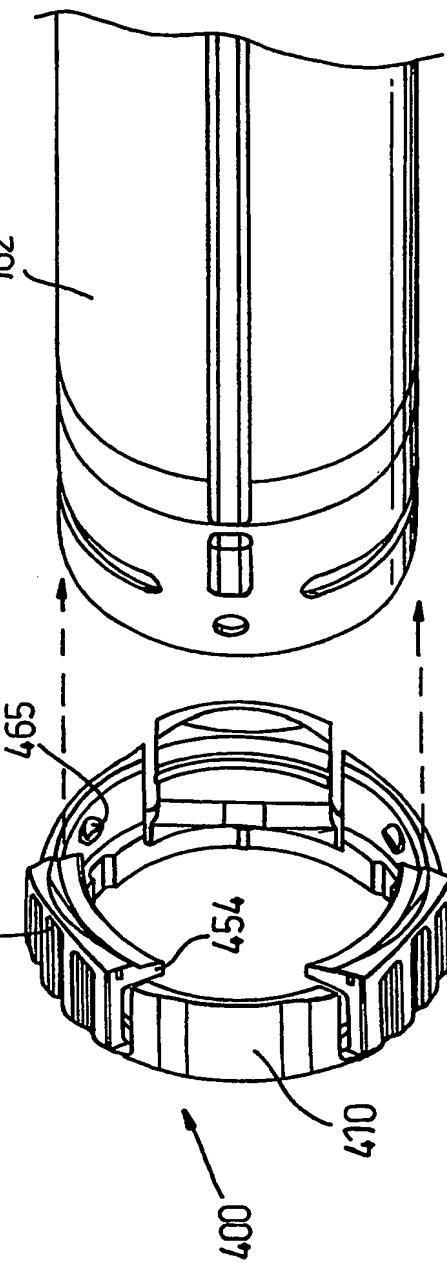


Fig. 13

12/16

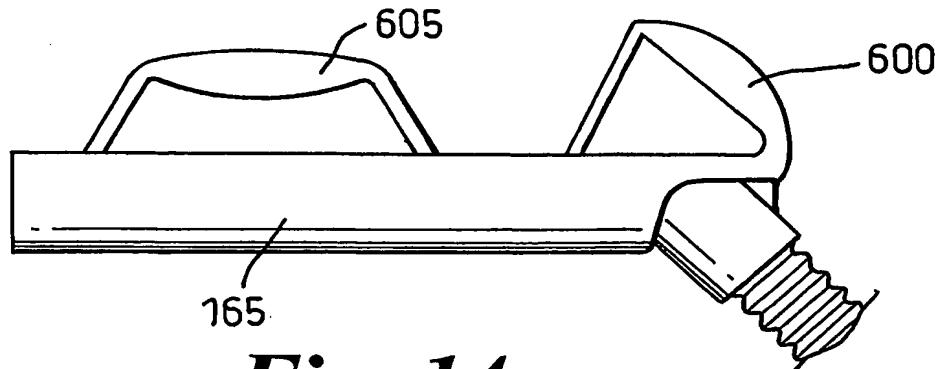


Fig. 14

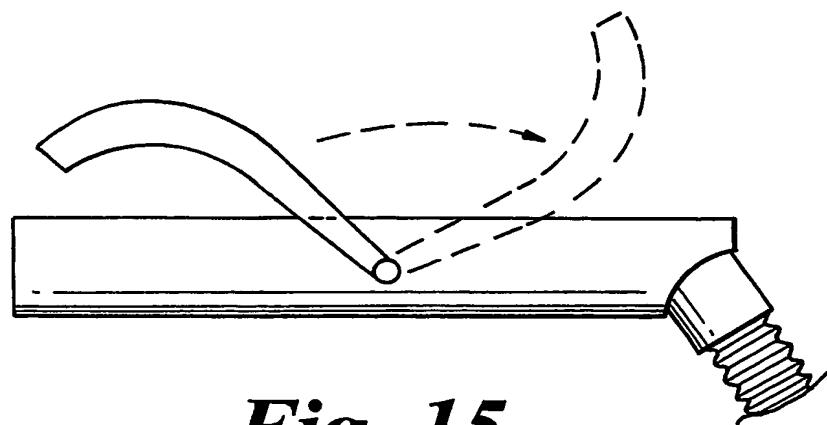


Fig. 15

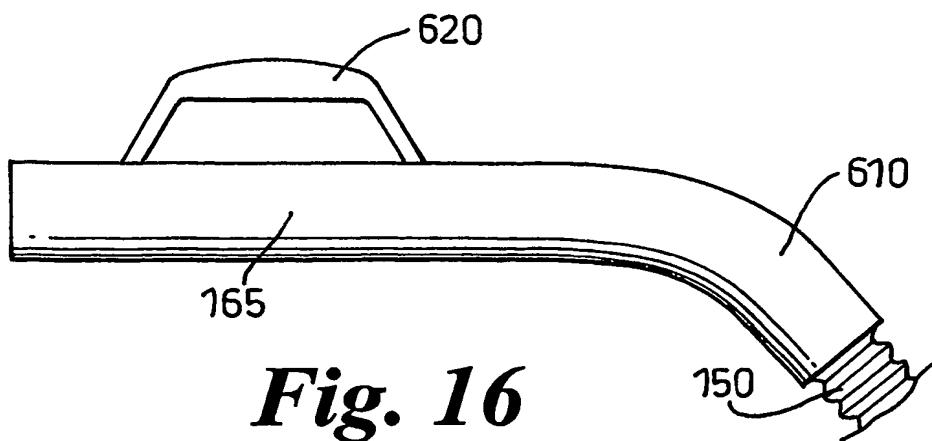


Fig. 16

13/16

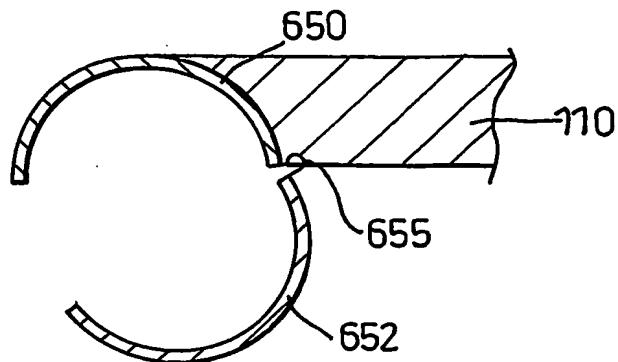


Fig. 20

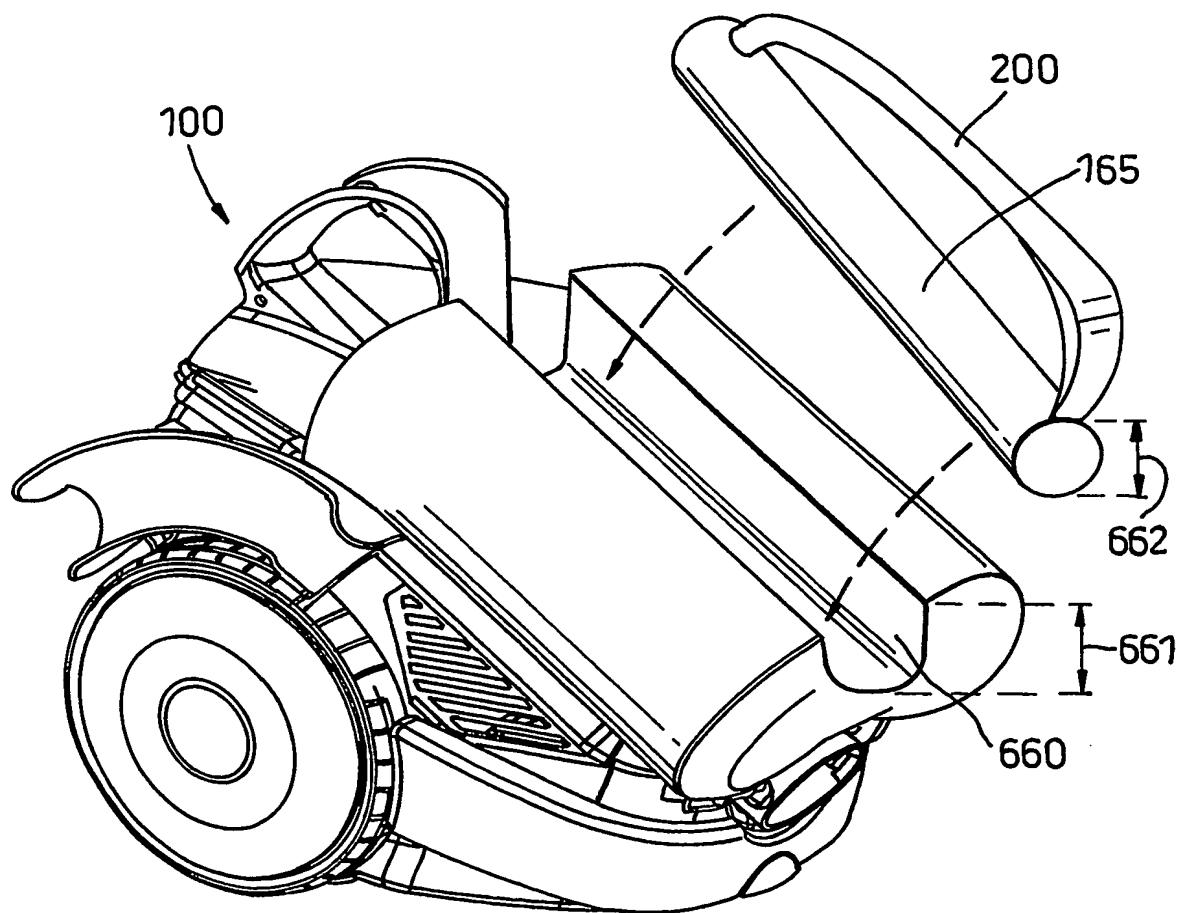
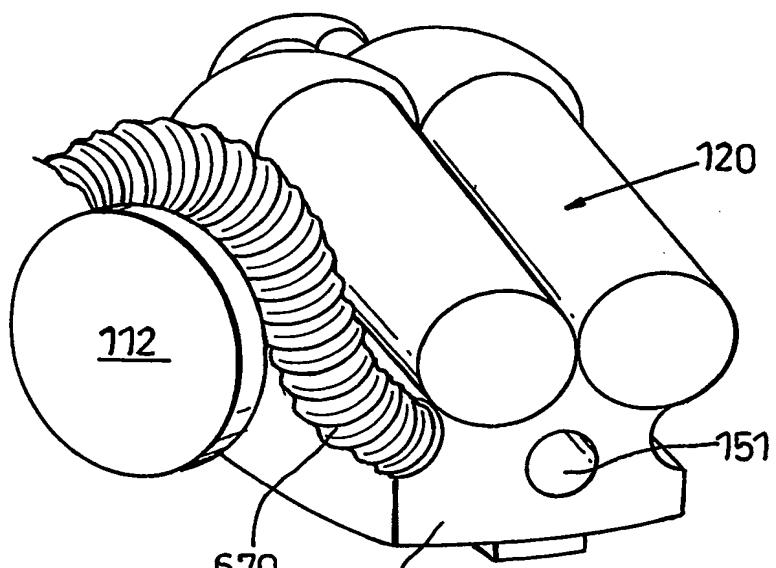
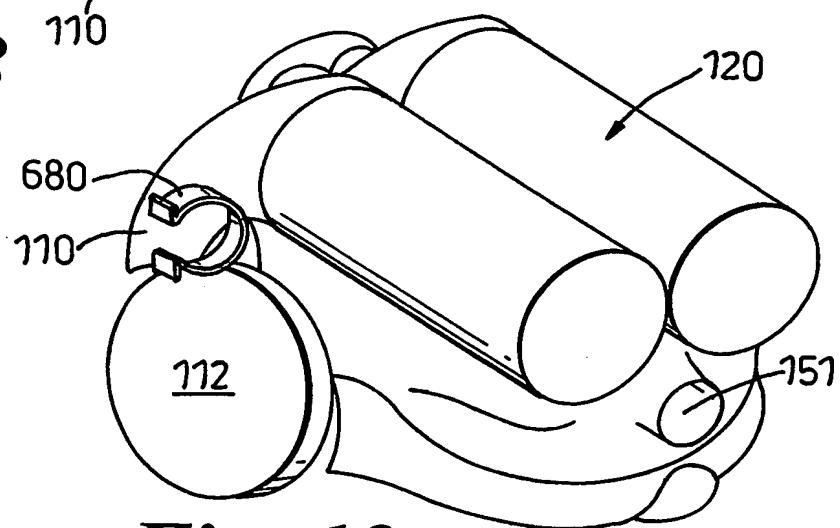
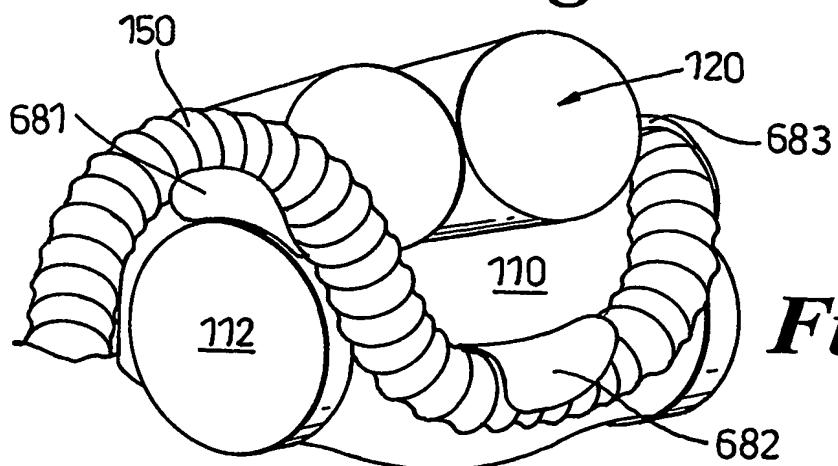


Fig. 17

14/16**Fig. 18****Fig. 19****Fig. 23**

15/16

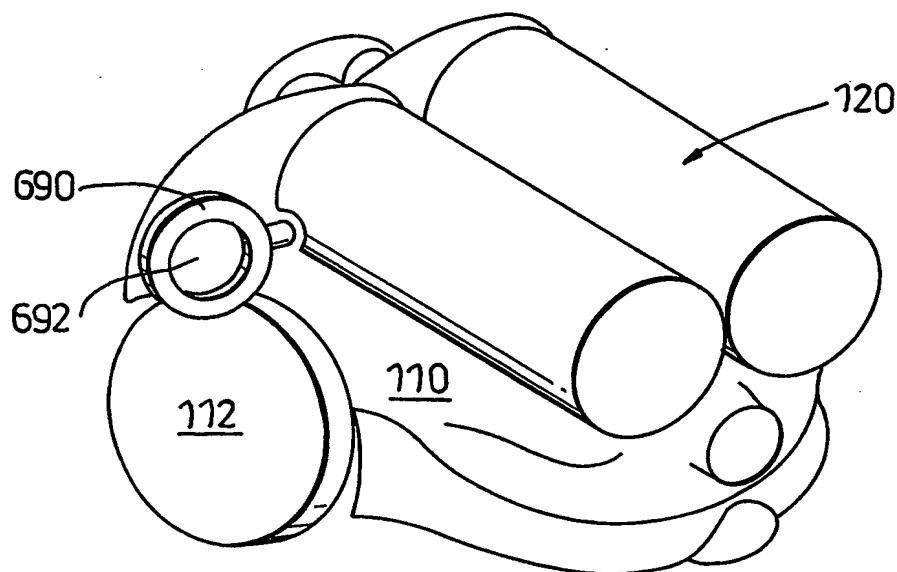


Fig. 21

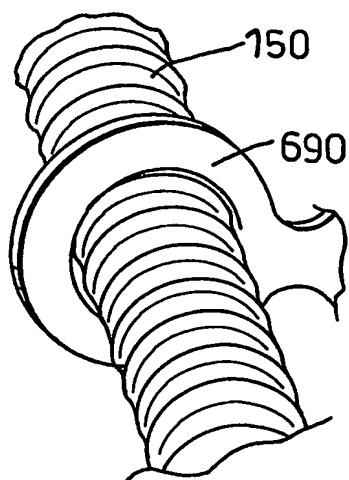
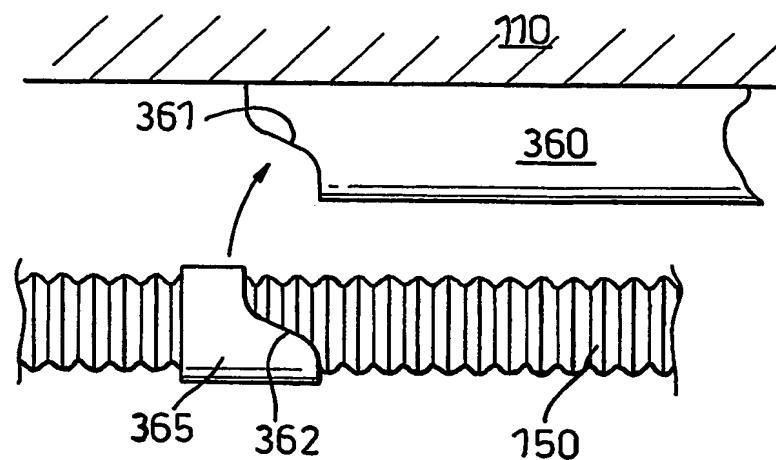
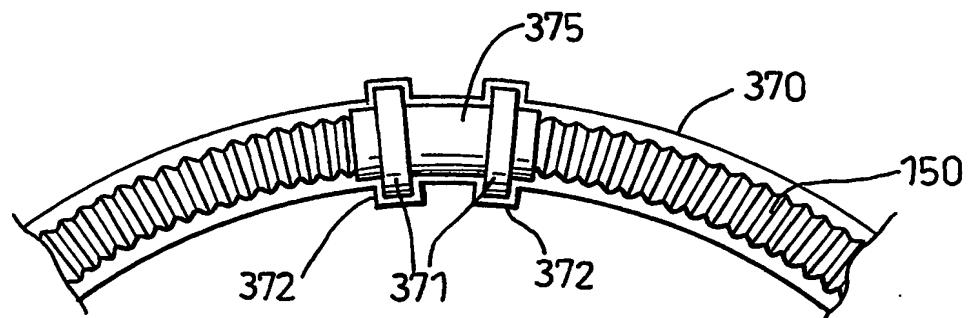
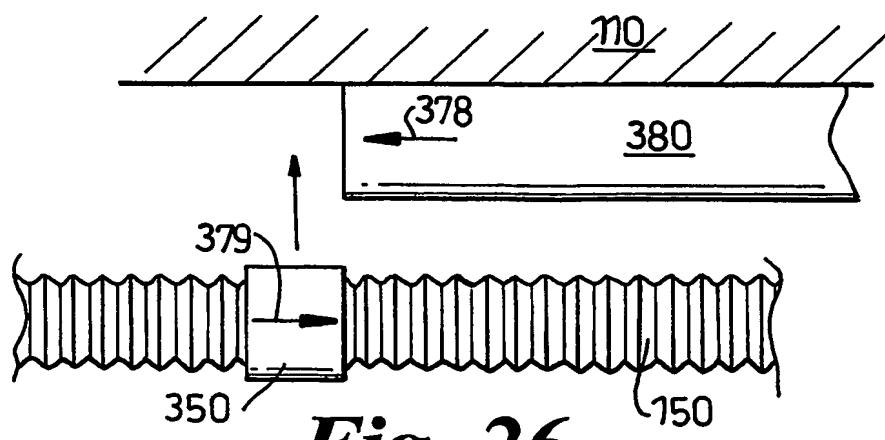


Fig. 22

16/16***Fig. 24******Fig. 25******Fig. 26***

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB 03/03667

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A47L9/00 A47L5/36

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A47L F16L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 298 16 382 U (EWA LUFTTECHNIK GMBH) 19 November 1998 (1998-11-19) page 3, paragraph 1 page 8, line 17-20; figure 1 ---	1
A	US 4 910 828 A (BLASE MICHAEL R ET AL) 27 March 1990 (1990-03-27) column 5, line 50 - line 56 column 7, line 48 -column 8, line 3; figures 1-3,8 ---	1,2, 9-13,17
A	DE 295 00 994 U (LUCAU MANFRED) 15 May 1996 (1996-05-15) page 4, paragraph 4; figures 1,3,4 ---	1,3,4,9, 11,13,18 -/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

19 November 2003

28/11/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5618 Patenttaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Papadimitriou, S

INTERNATIONAL SEARCH REPORT

Internat:	Application No
PCT/GB 03/03667	

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 030 650 A (ERNEST KIRALY) 24 April 1962 (1962-04-24) column 2, line 15 - line 20 column 2, line 23 - line 25; figure 4 ----	1,14,15
A	WO 89 12195 A (UTVAEGEN AB) 14 December 1989 (1989-12-14) page 1, paragraph 8 -page 2, paragraph 1 page 2, line 19 - line 23; figures 1,2 ----	1,19
A	GB 2 304 029 A (MOORE CLIFFORD A) 12 March 1997 (1997-03-12) figures 1,2A,2B -----	6,7,14, 15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 03/03667

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: 20 because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210

3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple Inventions in this International application, as follows:

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 20

Present claim 20 relates to an extremely large number of possible appliances. In fact, the claim contains so many options and possible permutations that a lack of clarity and conciseness within the meaning of Article 6 PCT and Rule 6.2(a) PCT arises to such an extent as to render a meaningful search of this claim impossible. Consequently, the search has been carried out for those parts of the application which do appear to be clear and concise, namely claims 1-19.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

INTERNATIONAL SEARCH REPORT

International	Application No
PCT/GB 03/03667	

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
DE 29816382	U	19-11-1998	DE	29816382 U1		19-11-1998
US 4910828	A	27-03-1990	NONE			
DE 29500994	U	15-05-1996	DE	29500994 U1		15-05-1996
US 3030650	A	24-04-1962	NONE			
WO 8912195	A	14-12-1989	AU SE WO	3752789 A 8802027 A 8912195 A1		05-01-1990 01-12-1989 14-12-1989
GB 2304029	A	12-03-1997	NONE			

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

REC'D 09 JUN 2004

WIPO PCT

Applicant's or agent's file reference WOP0246B	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB 03/03667	International filing date (day/month/year) 21.08.2003	Priority date (day/month/year) 14.09.2002
International Patent Classification (IPC) or both national classification and IPC A47L9/00, A47L9/00		
Applicant DYSON LTD et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.
3. This report contains indications relating to the following items:
 - I Basis of the opinion
 - II Priority
 - III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV Lack of unity of invention
 - V Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI Certain documents cited
 - VII Certain defects in the international application
 - VIII Certain observations on the international application

Date of submission of the demand 24.03.2004	Date of completion of this report 08.06.2004
Name and mailing address of the International preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Papadimitriou, S Telephone No. +49 89 2399-2760



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB 03/03667

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-21 as originally filed

Claims, Numbers

1-19 as originally filed

Drawings, Sheets

1/16-16/16 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB 03/03667

5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).
(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)
6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:
- the entire international application,
 claims Nos. 20
because:
 the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):
 the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
 the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
 no international search report has been established for the said claims Nos. 20
2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino-acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:
- the written form has not been furnished or does not comply with the Standard.
 the computer readable form has not been furnished or does not comply with the Standard.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-19
	No: Claims	
Inventive step (IS)	Yes: Claims	1-19
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-19
	No: Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB 03/03667

Re Item I

Basis of the report

1. Claim 20

No opinion was formed for claim 20 as no search report has been established for this claim.

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Independent claim 1

Best prior art: DE-U-29816382: cylinder type vacuum cleaner hose (70) disposed in a sinuous manner **in the interior** of the main housing (12) of the appliance (10).

Distinguishing features: in the cleaning appliance the hose (150) is disposed in a sinuous manner along a hose storage path around the periphery of the main body (100).

Technical effects: allows storage of hoses of greater length than the periphery of the appliance

Objective technical problem: realisation of a cleaning appliance with a hose storage path.

Inventive step: US-A-4910828 also teaches stowing a vacuum hose in a sinuous manner but only along one side (side wall 30) of the periphery of the appliance (figs. 1-3), resulting in sharp bends of the hose with consequent premature hose failure.

Industrial applicability: The claimed appliance is industrially applicable in the field of household cleaning equipment.

Conclusion: Consequently, the subject-matter of independent claim 1 complies with the provisions of Article 33, paragraphs (2)(3)(4) PCT.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB 03/03667

2. Dependent claims 2-19

These dependent claims define various embodiments of the appliance specified in independent claim 1 and also comply with the provisions of Article 33 paragraphs (2)(3)(4) PCT.

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.